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C-A OPERATIONS PROCEDURES MANUAL

14.15 C-A EMS Process Assessment for Materials Storage Building
(C-A-600)

Text Pages 2 through 8

Hand Processed Changes

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Approved: *Signature on File* _____
Collider-Accelerator Department Chairman Date

M. Van Essendelft

**BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT FORM**

I. General Information

Process ID:	CAD-602-STOR			
Process Name:	Materials Storage Facility			
Process Flow Diagrams:				
Process Description:	<p>This process includes the Materials Storage Operations, Tanker Water Storage Operations, Drum Storage Operations and Resin Exchange Operations managed by the Collider-Accelerator (C-A) Department. Experimental beamlines are constructed and disassembled, as required, in order to accommodate the particular experiments being conducted at that time and shielding is utilized to reduce or eliminate personnel and equipment exposure to radiation generated during beam operation. Shielding for the beamlines is typically reused from previous beamlines and when not in use requires appropriate storage. Shielding is constructed of concrete block, steel plates and less frequently, lead bricks and other materials.</p> <p>Tanker Water Storage Operations involves the draining and storage of low activity, low hazard water from C-A water systems during maintenance periods. The primary intent of this operation is storage for reuse. Similarly the building houses a Drum Storage and Resin Exchange area that supplements the water systems operations.</p> <p>The significant aspects associated with this operation are radioactive waste, hazardous waste generation, storage and use of chemicals.</p>			
Dept./Div.:	Collider-Accelerator Department			
Dept. Code:	AD			
Building(s):	974			
Room(s):	N/A			
Points of Contact:	A. Pendzick	4718	J. DeBoer	4668
Originally Prepared by:	M. Van Essendelft	Original Reviewers:	A. Pendzick, R. Karol, J. DeBoer	
Initial Release Date:	2/18/04			

II. Detailed Process Descriptions and Waste Determination

The process assessment includes the Collider Accelerator Department's indoor storage of shielding, resin exchange operations, filter drying, drum storage, and portable tanker operations. The shape, thickness and placement of the shielding are determined for each application. Shielding is stacked on the floor around the beamline creating what is referred to as a "tunnel." Magnets, electrical cables, cooling water lines, vacuums pumps and the beamline are located within the tunnel. The remainder of the support equipment is located outside the tunnel and is therefore shielded from radiation produced by the beam. Shielding is offset stacked so that the gaps between the materials do not align to create a path through which radiation could pass. Large overhead cranes located within the building are utilized to move the shielding. These cranes are maintained by the BNL Plant Engineering (PE) Division. Large steel plates and, less frequently, lead bricks are also utilized to provide shielding for the beamlines. While steel plates are utilized throughout, the lead bricks are used as a collimator (a device for producing a beam of particles with parallel paths). These materials are stored for future use when not immediately needed for shielding. The steel plates are stored in the outdoor Steel Yard located adjacent to the Block Yard north of Building 912 and the lead bricks are stored within a small building located to east of Building 912 for reuse at a later date. Concrete blocks, when not needed immediately for shielding, are stored in building 974 and in the outdoor Block Yard located north of Building 912 for reuse at a later date.

Shown below is the building layout and proposed storage layout plan. The layout plan has a shielded area where magnets from high radiation areas of 912 will be stored. In addition the layout has calculated storage for various sized shielding blocks and will have additional magnets stored on top of the shielding blocks. While a layout has been formulated for population of the Storage facility there are, currently, no funds available for the labor to transfer materials into this portion of the building. Currently, the building is used for limited material storage and for storage of cranes, flat-bed trucks and forklifts used in the transfer of material within the Collider Accelerator facility.

Regulatory Determination of Process Outputs

1.0 Shielding Storage Operations

Materials of concern found in storage are activated shielding blocks, activated magnets and activated steel plates. These items, specifically the concrete and steel shielding are being stored in the building to avoid impact on the environment due to outside storage. While it is understood that these are being stored for reuse, the table below lists the items as wastes to show the disposal path should the department determine that the items are no longer useable. For more information on shielding see the process assessment for Experimental Beamline Construction/Disassembly Operations.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
1.1	Scrap concrete shielding	Non-hazardous/ radioactive solid waste as determined by process knowledge/ radioactivity survey	If non-radioactive, discarded in trash; if radioactive, sent off-site as low- level radioactive waste.	None
1.2	Scrap steel shielding	Non-hazardous/ radioactive solid waste as determined by process knowledge/ radioactivity survey	If non-radioactive, discarded in trash; if radioactive, sent off-site as low- level radioactive waste	None
1.3	Scrap magnets	Non-hazardous/ radioactive solid waste as determined by process knowledge/ radioactivity survey	If non-radioactive, discarded in trash; if radioactive, sent off-site as low- level radioactive waste	None

2.0 Resin Exchange and Filter Drying Operations

The resin exchange operation is located in the enclosed area on the Water System Group's side of building 974. In order to optimize the quality of potable water used in C-A cooling systems and to remove particulates from the water system during cooling operations, filters and cartridges of resin are used to deionize and polish the water. Details on number of filters, number

of resin cartridges and placement within each water system can be found in the AGS Water Systems Process Assessment and the RHIC Water Systems Process Assessment. Spent resins are removed from cartridges in building 974 using a water slurry. The resins are placed in 55 gallon drums and then transported to Building 919 where they are allowed to dry. Once resins are dry they are disposed of as low level radioactive waste. During the process of removing spent resin cartridges from C-A Water Systems, spent filter bags are removed and replaced. Spent filter bags are brought to the 974 facility and are allowed to dry. Once the filters are dry they are surveyed and, if clean are disposed of as industrial waste. If the filter bags are radioactive they are disposed of as low-level radioactive waste.

Waste ID	Waste Description	Determination Basis	Waste Handling	Corrective Action Required
2.1	Inline bag filters	Non-hazardous/ radioactive solid waste as determined by process knowledge/ radioactivity survey	Waste is sent off-site for disposal as low-level radioactive waste. If non-radioactive then filters disposed of as regular trash.	None
2.2	Make-up deionizer resin (potable water)	Non-hazardous/ non-radioactive solid waste as determined by process knowledge	Resin is exchanged on-site and and disposed of as low-level radioactive waste	None
2.3	Polishing deionizer resin	Non-hazardous/ radioactive solid waste as determined by process knowledge/ radioactivity survey	Resin is exchanged on-site and and disposed of as low-level radioactive waste	None

3.0 Drum Storage Operations

The C-A drum storage operations involve the storage of various materials used in the water systems operations. This storage can consist of new pump oils, AC-500 (for magnet cleaning), spent oils from pump servicing and spent AC-500 and water from magnet cleaning operations. For additional details on magnet cleaning see the Magnet Cleaning Operations Process Assessment.

Waste ID	Waste Description	Determination Basis	Waste Handling	Corrective Action Required
3.1	Radioactive spent acid solution and water (neutralized)	Non-hazardous/ radioactive liquid waste as determined by process knowledge/ radiological testing	Waste is loaded into a tanker truck and transferred off-site for disposal as radioactive waste	None
3.2	Non-radioactive spent acid solution and water (neutralized)	Industrial/non-radioactive liquid waste as determined by process knowledge/ radiological testing	Waste is transferred off-site for disposal as industrial waste	None
3.3	Spent pump oil	Non-hazardous liquid waste as determined by process knowledge	Waste is transferred to the satellite accumulation area and placed in a 55-gallon drum which is transferred to WMD for disposal as industrial waste when full	None

4.0 Tanker Water Storage Operations

Radioactive water drained or collected from the various radioactive cooling water systems is transferred to one of three 7,000-gallon tanker trailers. The southeast side of building 974 was specifically designed in accordance with Suffolk County Article 12 requirements for the storage of these tanker trucks. These tanker trucks can be moved by truck throughout the site to facilitate transferring of wastewater. The tankers are constructed of stainless steel and are parked within the secondary containment area when not being used to transfer water.

Steam or electric heat can be supplied to the tankers to slowly heat the wastewater and evaporate it. The vapor contains tritium from the activated cooling water systems. The emissions have been assessed against NESHAPS requirements and radiation dose rates are well below levels that require continuous monitoring. DOE-BAO has reviewed the evaporation process and given the C-A Department approval to perform the operation as required. This evaporation of water from these tankers per DOE-O-835.1 is identified in the BNL Radioactive Waste Management Basis Document. Tanker water may be reused/recycled or evaporated.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
4.1	Tritiated water collected from activated cooling water systems	Non-hazardous/ radioactive liquid waste as determined by process knowledge	Water that is collected in tankers is not initially waste and can be recycled. Liquid waste, if any, is disposed of as radioactive waste.	None

III. Waste Minimization, Opportunities for Pollution Prevention

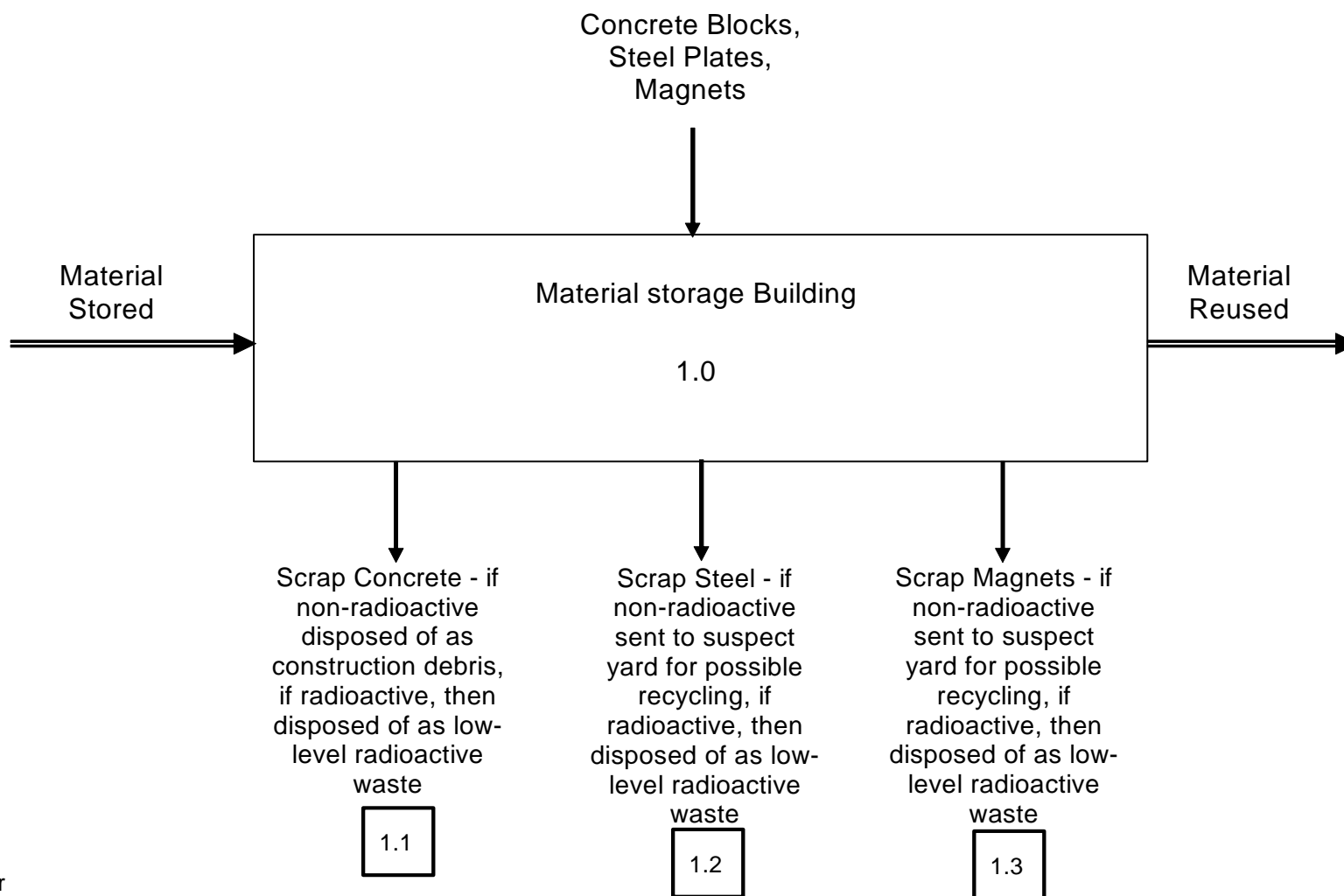
None

IV. Assessment Prevention and Control

None

ATTACHMENT 1

PROCESS FLOW DIAGRAMS



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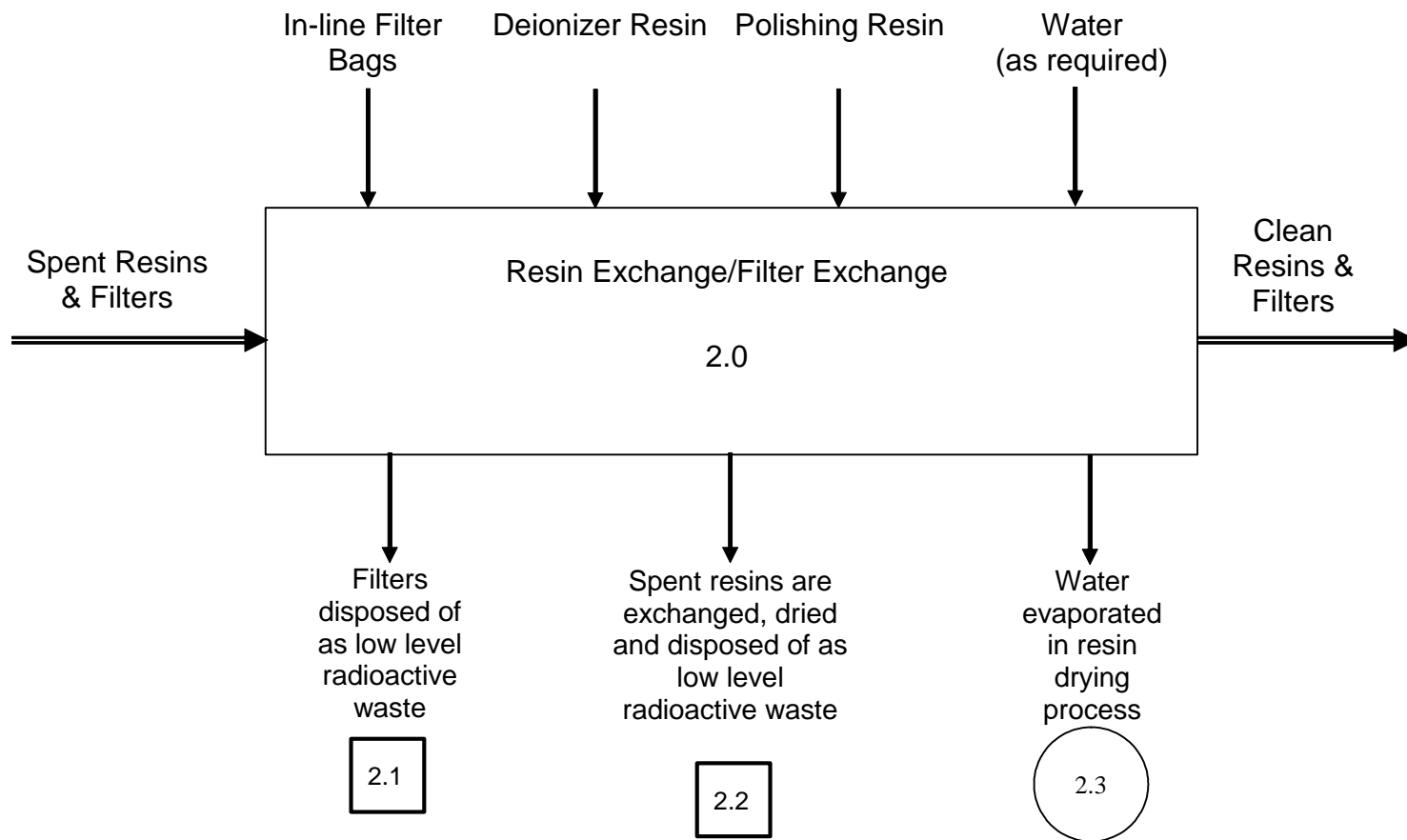
- Solid Waste
- △ Air Emissions
- Wastewater
- SS = Sanitary Sewer

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BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

**Collider Accelerator Department – Material Storage Operations
Process Flow Diagram – Material Storage**

CAD-602-STOR-01



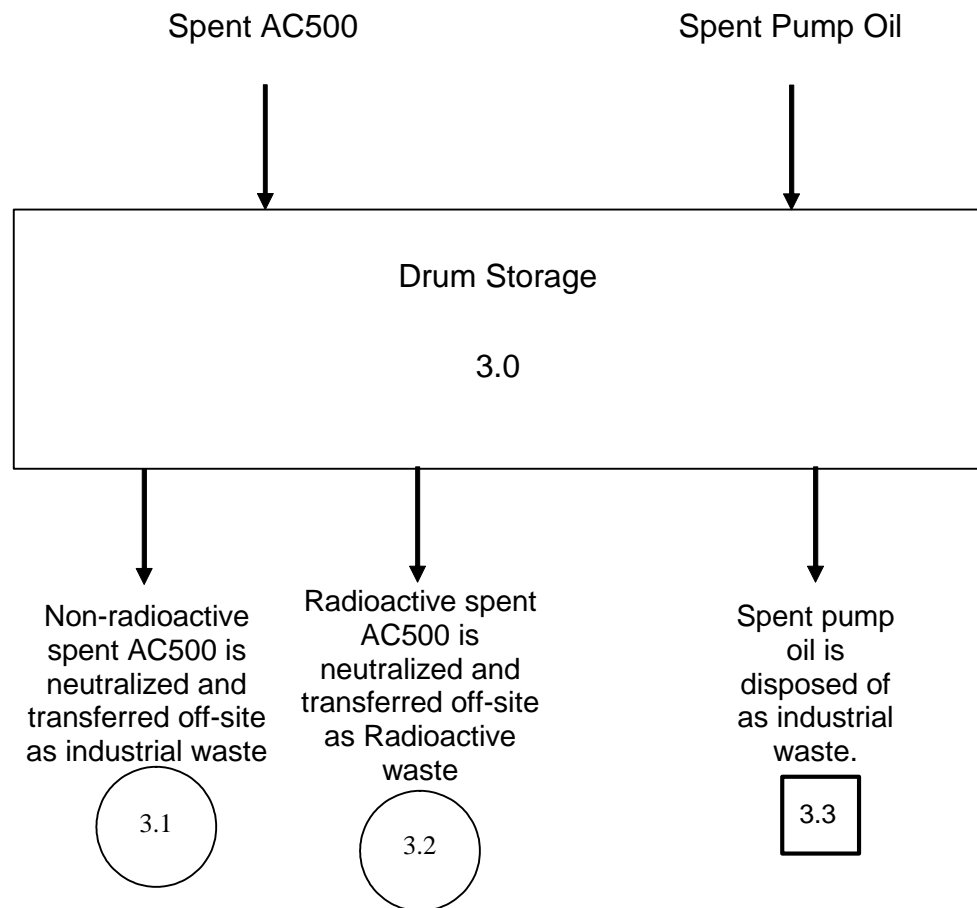
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- Solid Waste
- Air Emissions
- Wastewater
- SS = Sanitary Sewer

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BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM
Collider Accelerator Department – Material Storage Operations
Process Flow Diagram – Resin Exchange

CAD-602-STOR-02



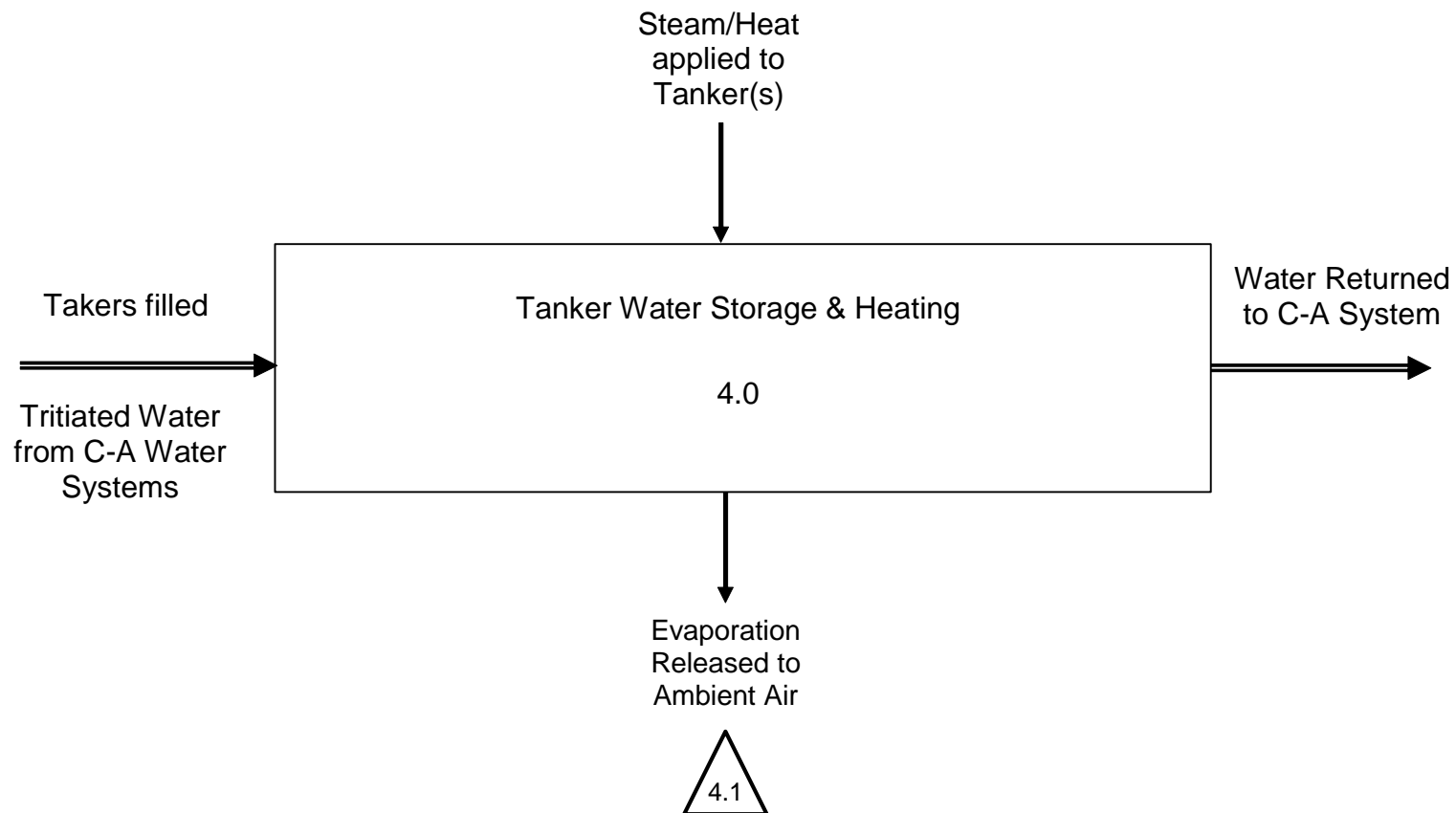
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- Solid Waste
- Air Emissions
- Wastewater
- SS = Sanitary Sewer

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BROOKHAVEN NATIONAL LABORATORY PROCESS ASSESSMENT PROGRAM **Collider Accelerator Department – Material Storage Operations** **Process Flow Diagram – Drum Storage**

CAD-602-STOR-03



Legend

□ Solid Waste

△ Air Emissions

○ Wastewater

SS = Sanitary Sewer

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BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM
Collider Accelerator Department – Material Storage Operations
Process Flow Diagram – Tanker Operations

CAD-602-STOR-04